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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/803,820 | 03/18/2004 | Steven A. Brown | 068267.000103 | 7020 |

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EXAMINER

DOOLEY, JAMES C

ART UNIT PAPER NUMBER

3634

DATE MAILED: 12/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------|------------------------------|--|
| Office Action Summary | Application No. 10/803,820 | Applicant(s) BROWN ET AL. | |
| | Examiner James C. Dooley | Art Unit 3634 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. In line 12, Applicant has not disclosed the number or position of the selected sidewalls.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wingo (US 6,357,604) in view of Hengst (US 5,931,666). Wingo discloses a semiconductor wafer carrier (11) having a plurality of rails (12, 14), each rail having a plurality of teeth (24, 26), and each tooth having a raised support surface (30) for supporting silicon wafers. The raised surface of Wingo is intended to provide uniform support so as to prevent stress concentrations (col. 2 ln. 59-61). Applicant has disclosed that although the elongated support of Wingo reduces slip; there remains

need for further improvement (par. 18 ln. 1-2). Wingo discloses the raised support structure to be a ledge, shown as rectangular with right angle intersections between the upper surface and sidewalls (fig. 2). Wingo has also disclosed the ledge can be of other configurations (col. 5 ln. 35-37). Applicant has disclosed that the sharp edges of the raised surface of Wingo cause stress concentrations resulting in slip.

Hengst teaches silicon wafer support featuring a plurality of teeth where the teeth have a rounded edge in order to increase the support area of a sagging wafer. Accordingly, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify the support surface of Wingo to have rounded corners. The motivation presented by Brown is to increase support area thereby reducing stress concentration and preventing slip.

Regarding claims 3, 4, 14, 15, Wingo discloses that normally the teeth are between 20 and 150mm (col. 4 ln. 51-53).

Regarding claims 5 and 16, Hengst teaches the radius of curvature to be greater than 1mm (col. 4 ln. 63-64)

Regarding claim 6 and 17, Applicant claims that the radius should not exceed 2.5mm, whereas Hengst discloses the radius to be not less than 3mm (Col. 4 ln. 63-64). Applicant is referred to *In re Aller*, where the federal circuit court decision states,

[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” (220F.2d 454, 456, 105 USPQ 233, 235)

Accordingly Wingo and Hengst together disclose teeth with a raised support surface having chamfered edges. The exact radius of the chamfer is immaterial as one with ordinary skill in the art could easily discover optimal dimensions for a variety of conditions.

Regarding claims 7,9,18,20, Wingo discloses the support structure to extend from the front tip of the tooth to a distance at least 70 or 80% the length of the tooth (col. 4 ln. 57-58)

Regarding claim 8 and 19, Wingo discloses that the ledge (30) can have alternate configurations but does not specifically disclose a wedge. Hengst discloses the wafer support structure to be wedge shaped (arms 17 see figure 2). Accordingly, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify the support structure of Wingo to be of wedge shaped as disclosed by Hengst. The motivation would be to strengthen the teeth while minimizing contact area with the wafer.

Regarding claim 10 and 21, Wingo discloses that the rack is made of Silicon carbide (col. 6 ln. 2).

Regarding claim 11 and 22, Wingo discloses the rails to be a monolithic structure (col. 6 ln. 2-3)

Regarding claim 12 Wingo discloses a generally planar plate (10) with the support rails extending vertically therefrom.

Comments

In Claims 8 and 19 Applicant discloses the support structure to be wedge shaped. Applicant does not claim the wedge narrowing as it runs from the tip of the tooth towards the rail as is shown in the submitted drawings. Applicant has not disclosed a motivation for this configuration. Hengst teaches the wedge shape narrowing as it extends outward from the rail. In the submitted disclosure Applicant teaches away from having the wider part of the wedge on the tip of the tooth, "it is preferable that the contact area with the underside of wafer 16 be as small as possible." (par. 32 ln. 1-2). Applicant is requested to provide reasons why a wedge shape offers advantages over a straight wall and why the wider part of the wedge should be located at the tip of the tooth. With no provided justification, the wedge shape and orientation of the wedge will be seen as a design choice.

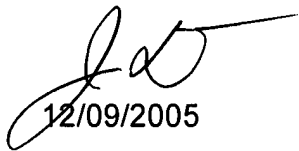
Applicant has disclosed that rounded curvature on the sidewalls of the ledge reduce stress concentrations (par. 35, ln. 5-6). Applicant has not disclosed the mode of how rounded edges reduce stress concentrations. As seen in a search through prior art there are other reasons for supplying a chamfer on the wafer support surface, i.e. to facilitate inserting wafer into slot and onto support surface, and to avoid scratching the wafer.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James C. Dooley whose telephone number is 571-2721679. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Chilcot can be reached on 571-272-6777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



12/09/2005



RICHARD E. CHILCOT, JR.
SUPERVISORY PATENT EXAMINER